

Recommendations of the Energy/Renewable Energy Working Group

Recommendations (not yet prioritized)

1. The City should set renewable energy goals
2. The City should educate residents about the benefits of renewable energy
3. The City should provide free energy audits
4. The City should sign up for PG&E's ClimateSmart program
5. The City should promote enrollment in PG&E's ClimateSmart program
6. The City should install solar on City property and encourage schools to do the same
7. The City should encourage participation in Demand Response programs
8. The City should encourage property owners to undertake energy-efficiency upgrades
9. The City should implement a pilot program to provide solar PV for affordable apartments
10. The City should promote solar water heating

Introduction

This Working Group developed five goals related to promoting renewable energy (1, 2, 6, 9, 10), three related to reducing the demand for energy (3, 7, 8) and two related to carbon offsets (4, 5).

Of the five primary forms of renewable energy (i.e., solar, wind, hydro, biomass and geothermal), solar is most abundant in our area. We see great potential – both immediately and over the next 10+ years -- for solar energy to provide a very significant share of Mountain View's electricity and hot water heating needs. Solar also has an important role to play in providing winter space heating for new buildings.

Energy conservation and demand management (which shifts the time of day when electricity is used) aren't particularly glamorous activities, but they have outstanding environmental and financial paybacks. PG&E has pioneered the use of cash incentives to get businesses and residential consumers to conserve, and we advocate amplifying their efforts in Mountain View.

Carbon offset programs are a very important new development. Unfortunately, they are not yet well understood even by the small fraction of residents who are aware that they exist. Nevertheless, we consider them to be a vital part of our recommendations because they have three distinct advantages: they require no ongoing behavioral change, they can produce a massive positive impact, and their cost per metric ton of CO₂ avoided is exceptionally low. We are fortunate that PG&E has already set up a carbon offset program called *ClimateSmart* that all of its customers can participate in. We simply need to participate in the program that they have already established.

Carbon Dioxide Content of \$1 of Natural Gas and \$1 of Electricity

When natural gas is priced at \$1.50/therm, \$1 buys .667 therms. Each therm burned produces 11.7 pounds of CO₂. Therefore, \$1 worth of natural gas produces **7.8** pounds of CO₂.

When electricity is priced at \$.16/kWh, \$1 buys 6.25 kWh. PG&E estimates that kWh produces .459 pounds of CO₂. Therefore, \$1 worth of electricity produces **2.9** pounds of CO₂.

From these two ratios we conclude that the most cost-effective Greenhouse Gas reduction is likely to come from using conservation and renewable energy to displace natural gas usage rather than electricity usage.

Some electricity saving techniques, such as CFLs, have remarkably high returns on investment. However, we think that too little emphasis has been given in the public discussion of climate change to the importance of reducing natural gas usage, compared to the amount of attention paid to electricity conservation and solar PV.

Furthermore, in the next few decades the growing use of non-carbon-generating sources in PG&E's electricity mix will reduce the amount of CO₂ produced by each kWh generated by 1-2% per year. This should cause society to increase its focus on natural gas conservation and on the replacement of natural gas for heating water and buildings by renewable alternatives.

Recommendation #1 (JBL1)

Title: The City should set renewable-energy goals

Working Group: Energy/Renewable Energy

Statement of Issue To decrease our use of non-renewable energy sources, we need to do all of the following, in order of increase initial cost:

1. use less energy (conservation),
2. use energy more efficiently,
3. use an increasing proportion of renewable energy sources to take care of our remaining needs.

In relation to this third option, "local" is often better, and we need a good selection of it. Local energy production is less subject to the disruption risks of long-distance energy-superhighway distribution channels, as well as contributing to the overall greening of our energy supply. It may be more or less efficient than non-local sources, depending on the type and application.

Recommendations:

1. The City Council should direct Staff, and/or determine that a volunteer corps is needed, to set up a system for determining our current installed inventory of alternative energy sources (photovoltaics, solar hot water heating (for any use, including pools), any type of space heating that doesn't use a conventional furnace or wall heater, wind, etc.), and also track newly-installed systems systematically. Information collected should include: location, size (in appropriate units), generation potential, and any other interesting system attributes.
2. The actual contribution of these systems (unless they are known not to be in use) to our energy supply should be computed as a conservative 80% of their generation potential. (This takes into account downtime, shading, any other problems.)
3. Mountain View's (decreasing) overall energy consumption should be publicized, with the estimated local alternative energy component, as a percentage of the total, broken out.
4. The Council should set a goal of increasing this percentage figure annually by 1% of the first-year amount (the first year that we have the numbers for). (The original absolute quantity will be a greater percentage of decreasing total quantity each year.)

This is a short-term recommendation, since it can and should start as soon as possible.

Environmental Impacts:

1. Improve profile (by decreasing proportion of GHG-producing energy production) of regional as well as local energy supply.
2. Discourage GHG production of energy used in Mountain View, helping our required decreases.

Fiscal Impact and Synergies:

1. If volunteers are used properly in this effort, minimal staff time will be needed to coordinate retrieval of information from City records and make sure information collected is stored properly.
2. This will help with implementation of all other GHG-reducing projects in the city, having an indirect positive fiscal impact.
3. It will improve the robustness of the local energy supply (a sustainability improvement).

Obstacles: Can't think of any.

Partnerships: A volunteer group, TBD, to collect data. See elsewhere in Task Force report.

Citations: [coming]

Recommendation #2 (MB2)

Title: The city should educate residents about the benefits of renewable energy

Working Group: Energy/Renewable Energy

Statement of Issue

Recommendation

Environmental Impact

Fiscal Impact and Synergies

Obstacles

Partnerships

Recommendation #3 (MB1)

Title: The city should provide free energy audits

Working Group: Energy/Renewable Energy

Statement of Issue

Small business use X% of energy in Mountain View and they have little time or expertise to focus on reducing energy consumption. Residential customers account for Y% of the energy use and have similar issues in terms of lack of expertise.

Recommendation

The Cambridge Energy Alliance (CAE) provides free energy audits to commercial and residential customers through contracted Energy Services companies. CAE also provides a streamlined process for accessing financing for the loans to implement the recommendations. CAE is a non profit which works with the city of Cambridge to achieve energy consumption reductions. They get their funding through a state energy tax.

We recommend that the city use a modified version of the CAE program. The city should offer free energy audits to a high opportunity small business and residences by contracting with energy services companies and simplifying the loan process. This would be paid for through an increase in the MV utility tax and possible support from government agencies like the Air Resources Board or other nonprofit organizations.

Environmental Impact

Acterra has experience in residential programs. The impact in Palo Alto was X tons of CO2 reduced at Y cost.

CAE experience indicates

Fiscal Impact and Synergies

Obstacles

Partnerships

Recommendation #4 (SP1)

Title: The City should sign up for PG&E's ClimateSmart program

Working Group: Energy/Renewable Energy

Statement of Issue

PG&E offers an

Recommendation

In the short term, the City of Mountain View should enroll in PG&E's ClimateSmart program to offset 100% of the CO₂ produced as a byproduct of the electricity and natural gas that city operations consume.

In the medium-term (1-3 years), the city should require that PG&E offer an option to purchase energy from only renewable sources (except for the natural gas that it needs). SMUD (Sacramento Metropolitan Utility District) has a renewable energy purchase program called "Greenergy", which could serve as a template for PG&E to follow. Purchasing renewable energy is better for the environment because it is a more direct way to remove CO₂ from the atmosphere. Rather than paying someone to take your carbon, you pay someone to avoid making carbon in the first place.

Environmental Impact

1. Establish a leadership role as a city government that offsets 100% of the CO₂ produced as a result of consuming electricity and natural gas
2. X tons of CO₂ reduced per year

Fiscal Impact

Enrolling in ClimateSmart adds an additional fixed rate of \$0.00254 per kilowatt-hour (for electricity) and \$0.06528 per therm (for natural gas).

Obstacles

- Cost

Partnerships

PG&E can enroll the city in ClimateSmart.

Web Sites (not referenced in footnotes)

ClimateSmart: <http://www.pge.com/climatesmart/>

Greenergy: <http://www.smud.org/community-environment/greenergy/index.html>

Contact Information

Scott Peterson: scottp100@gmail.com

Recommendation #5 (BK1)

Title: The City should promote enrollment in PG&E's ClimateSmart program

Working Group: Energy/Renewable Energy

Statement of Issue

PG&E's ClimateSmart carbon-offset program is a very easy and inexpensive way to offset the GHG released by residential and commercial use of electricity and natural gas. Once people are signed up for it, they are likely to stay enrolled. The City can encourage initial enrollment through a well publicized tax holiday which would make ClimateSmart free for one year to all residential and commercial customers.

Recommendation

The City should have a one year Utility Tax Holiday (electricity and gas only) for residents and businesses that sign up for ClimateSmart. (Medium Term)

Environmental Impact

PG&E says a typical residential customer uses 540 kWh/month and 45 therms/month, resulting in a bill of \$140/month. 540 kWh/month produce 2,974 pounds of CO₂/year according to PG&E, and 45 therms/month produce 6,318 pounds of CO₂/year.

If there are 30,000 residences and each were enrolled in ClimateSmart the CO₂ reduction would be 278,760,000 pounds of CO₂ (126,537 metric tons) in the first year.

Assume 20% of the initial enrollees drop out every year after year 1. If so, the average customer will participate in ClimateSmart for 4.94 years based on a 20-year analysis. $4.94 \times 126,537 = 625,090$ metric tons of CO₂.

Assume that commercial usage will be equal to residential usage.

Fiscal Impact and Synergies

The City's utility tax is 3%, or about \$5.20 per residential account/month. Assuming 30,000 households, the cost would be \$1,872,000 for one year if every household enrolled.

PG&E says the typical residential customer enrolled in ClimateSmart will pay less than \$5 per month. (This amount is tax deductible). The exact amount varies with actual energy use—with a cost of \$0.00254 per kilowatt-hour (for electricity) and \$0.06528 per therm (for natural gas).

Cost per Metric Ton of CO₂ Eliminated or Avoided

Residential $\$1,872,000 / 625,090 \text{ tons} = \$2.99 / \text{metric ton}$

Obstacles

The size of the financial outlay is quite high, but the cost per ton is extremely low.

- There may be legal barriers or legal challenges
- There may be operational challenges for PG&E to implement this program

Partnerships

PG&E would undoubtedly be eager to partner with the City on this program. The tax holiday, if approved by the City Council, would be implemented by their software engineers, and should be simple to accomplish.

Grant funding may well be available if we are the first city to initiate a program of this kind. Subsequent award funding may be available from DOE or other agencies to recognize this innovative approach.

Recommendation #6 (SP2)

Title: The City should install solar on City property and encourage schools to do the same

Working Group: Energy/Renewable Energy

Statement of Issue

Solar photovoltaics saves money, reduces carbon emissions, and creates jobs. Simply put, going green means saving green. Installing solar photovoltaics, or Solar PV, on schools has high visibility to the community and sends the message that it is practical. It saves the school money, and inspires the community to learn more about renewable energy.

Recommendation

In the long term, set a goal to install Solar photovoltaic systems on all elementary, junior high, and high-schools in Mountain View. Partner with PG&E to educate children about renewable energy using the Solar Schools Program that they developed. Stage deployment to one school at a time to distribute the cost over many years.

Environmental Impact

1. An example system in California schools was built in Pioneer Elementary School in Brentwood, CA. It's a 42kW system and saves 21 tons of CO₂ per year.
2. Assuming current electricity rates (conservative prediction), system pays for itself in x years and supplies free power for a lifetime of y after that. Savings are even greater if energy costs rise. Inverters need replacement in 15 years, panels last 25-40 years

Installing solar photovoltaics on Mountain View schools is a win-win-win-win game. It saves money, it promotes sustainability to children and parents, it reduces carbon emissions, it creates jobs.

Businesses in our community are demonstrating the economic viability of solar pv systems. For example, Google installed one of the largest solar photovoltaic systems in the world on their site, and are seeing their investment pay off in lower utility bills. On google.org website, they claim that the installation will pay for itself in 7 ½ years.

San Jose Unified School District signed an agreement in 2007 to install solar PV systems in all of their K-12 schools. Over the 25-year lifespan of the project, the district expects to save \$25 million in energy costs and reduce its utility power demand by 25 percent. Overall, the district estimates it will cut the equivalent of 37,500 tons of carbon dioxide emissions.

Installing solar pv on Mountain View schools broadcasts a message to our community that solar pv is mainstream, and it works. PG&E offers a solar educational program that schools can leverage to educate students about the benefits of renewable energy.

Fiscal Impact and Synergies

Roughly \$z initial cost per school is repaid through electricity utility bill savings over y years. A power purchase agreement (PPA) could eliminate up front costs and create predictable cost of electricity for the schools. This is a model that worked for San Jose schools.

Obstacles

- Although solar PV saves money over the long term, almost the entire cost of the system is front-loaded in installation and equipment purchase. Government installation incentives for schools are different than for homes or for businesses. We need to partner with a solar installer that can work with us to create the best financing model such as a power purchase agreement (PPA).

Partnerships

We need to solicit bids from Power Purchase Agreement providers (PPA) such as Chevron and solar pv installer companies such as SolarCity. In their bid, they should present a financing model that keeps the up-front cost low with a goal that the installation can pay for itself within 15 years. We can partner with PG&E to educate children on the value of solar using curriculum developed by PG&E called the “Solar Schools Program” (web site listed below).

Web Sites (not referenced in footnotes)

PG&E Solar Schools Educational Program:
<http://www.need.org/pgesolarschools/ec.htm>

Pioneer Elementary School PV system in Brentwood:
<http://www.californiasolarcenter.org/solareclips/2004.09/20040907-3.html>

Google 1.6 MW solar pv array:
<http://www.google.com/corporate/green/energy/reducing.html>

San Jose Unified School District Solar agreement
<http://www.schoollibraryjournal.com/article/CA6464645.html>

Recommendation #7 (HV1)

Title: The City should encourage participation in Demand Response programs

Working Group: Energy/Renewable Energy

Statement of Issue

From 2005 base line data: Commercial and Industrial sectors together account for 80% of annual CO₂(e) emissions from electricity use.

- o Commercial + Industrial: 149,375 (108,220 + 41,155) metric-tons of CO₂e
- o Total: 185, 682 metric-tons

Recommendation

Energy curtailment is the least expensive way to avoid construction and deployment of low utilization (only during peak demand) power plants that are typically natural gas fired. Customers can participate in demand response programs from PGE & third party aggregators. Several program are offered by IOU and Aggregators.

The city can encourage/motivate participation in demand response programs using economic means – with an increase in utility (electricity) user tax receipts with IOU/Aggregator partnership

Proposal: Provide a time-limited utility tax reduction to Commercial and Industrial customers that participate in PGE/Aggregator Demand Response (DR) programs. For others, raise the utility tax rate for the same duration thereby providing time-limited economic impetus for participation. Assumption is that once customer is on DR program, and recognizes the benefits, the utility tax rate stimulus will not be required and the CO₂(e) emissions will decrease with increased participation. Increased participation rate would reduce demand for current and future construction of conventional energy (natural gas, coal etc.) driven power plants as thereby reduce CO₂e emissions.

- Next steps: Develop financial model to study and determine optimal tax reduction duration and utility tax rate incentive. Proposal benefits start accruing soon after approval and implementation – so, it is both a near- and long-term solution.

Environmental Impact

Increase awareness and participation in DR programs will reduce need for bringing online expensive power plants during peak summer months.

- 1) Fewer low utilization, natural gas fired power plants operating in peak summer months fewer GHG and CO₂e emissions.
- 2) Serve as trigger to examine daily/seasonal consumption and launch programs to optimize them. Incentive: Annual participation payment and actual reduction in load payment.
- 3) Reduce future energy demand decrease future CO₂e emissions.

Fiscal Impact and Synergies

Proposal will NOT reduce utility tax revenue to the City. Qualitatively: The proposal will increase utility tax receipts at first when customer participation is low, and will converge on current level after agreed upon participation rate is met OR after tax reduction duration expires.

Obstacles

Perceived Obstacles:

- Time limited increase in utility tax required. Will need political will to promote and gain agreement on.
- Increase tax rate may make city appear business unfriendly. Can be overcome by building awareness, education and business/public outreach.

Actual Obstacle:

- Informing commercial and industrial customers about program, its benefits to the City and the customers with the desired goal of convincing them to adopt and implement DR.

Partnerships

PGE already collects Utility tax for service and pays out to City. Extend this to adjust utility tax rate for commercial and industrial DR participants (any/all forms).

Benefit to City: Reduced GHG in a sustainable manner, time limited increased utility tax receipts
Benefit to PGE: Increased participation in DR program. Estimate no major change in systems to support implementation of proposal. Reduced operation and management expense of high costing peaker plant electricity.

Recommendation # 8 (BK3)

Title: The City should encourage property owners to undertake energy-efficiency upgrades

Working Group: Energy/Renewable Energy

Statement of Issue

The majority of residents live in rented housing. Many rental units have substandard insulation, poorly maintained furnaces, leaky windows, and lack awnings or window films that would keep them cooler in summer. Innovative incentives are needed to improve the energy efficiency of apartments and apartment buildings, because currently neither landlords or tenants have an incentive to invest in this kind of work.

Recommendation

For 1 year the City should double-match PG&E's energy rebates for apartments, and the following year the City should match PG&E's rebates. These rebates generally apply to ceiling insulation, wall insulation, window film, water heaters, clothes washers, dishwashers and air conditioners. (Medium Term)

Environmental Impact

It is not possible to estimate the environmental impact with the available data.

One way to increase apartment owner interest in this program would be for the city to, in some way, certify energy efficient rental buildings. The intention is not to have a complex rating process, but simply to make it easy for tenants to know whether the building they live in (or are thinking of moving into) has ceiling insulation, wall insulation, etc.

Fiscal Impact and Synergies

Assume 500 apartments participate each year. Assume \$1,000 is invested in each apartment. Assume the City's contribution is 20% in Year 1 and 10% in Year 2. Then the total cost to the City would be \$100,000 in Year 1 and \$50,000 in Year 2 to leverage \$750,000 of private investment. PG&E would contribute \$100,000 over the two-year period through their existing rebate program.

Cost per Metric Ton of CO2 Eliminated or Avoided

Obstacles

Even with double-rebates, building owners still need to be communicated with and convinced that the improvements are worth doing.

Partnerships

PG&E could help the City publicize and manage this program. Grant funding might also be available for some parts of the program.

(Note to users: include footnotes directly in the explanatory text here. To insert a footnote, depending on your version of Word, from the *Insert* menu choose *Footnote*, or from the *Insert* menu choose *Reference* and then *Footnote*. The footnote will automatically appear at the bottom of the page.)

Recommendation #9 (BK2)

Title: The City should implement a pilot program to provide solar PV for affordable apartments

Working Group: Energy/Renewable Energy

Statement of Issue

The majority of residents live in rented housing. Many rental units have outstanding solar exposure. Innovative incentives are needed to get solar installed on apartment buildings, because currently neither landlords or tenants have an incentive to invest in it.

Recommendation

The City should investigate the possibility of giving solar systems to certain apartment owners who agree to not raise rents by more than 2.5%/year for 5 years as a way to preserve affordable housing and reduce GHGs. This program would only be available to units that rent for less than the average rent (\$/sq. ft.) for a Mountain View apartment – in other words, only to the more affordable half of Mountain View’s rental housing stock. (Long Term)

Environmental Impact

PG&E says a typical residential customer uses 540 kWh/month. Let’s assume the average apartment uses only 400 kWh. Offsetting 75% of this with solar would displace 300 kWh/month of PG&E-supplied electricity. That amount produces 1,890 pounds of CO₂/year or .945 tons/year. Over the 30 year life of the solar PV system 28.35 tons would be avoided. If 500 systems are purchased in this program, the impact would be 14,175 tons.

Fiscal Impact and Synergies

A 2.4 DC kW solar system can produce 300 kWh/month, and such a system can be purchased and installed for a net cost of about \$13,000/system in a bulk purchase by a City Government. Let’s assume that 500 systems were purchased initially, for a total investment of \$6,500,000.

Assume the average rent on a participating unit is \$1400/month. With the voluntary temporary rent stabilization aspect of the program, each renter will avoid about \$13,580 in rent payments over 5 years (assuming that rent would have gone up by 10%/year without the program.) Their electricity bill will also be reduced by about \$500/year or \$2,500 over 5 years.

Thus, though this appears to be a transfer of city funds to landlords, it is actually a transfer to the renters during the first five years. After the rent stabilization period expires, landlords will be able to charge market rents again, and these will be higher than on non-solar apartments because the solarized units will have lower electricity bills (by about \$50/month). The solar system will last 25 years beyond the initial 5 year period, giving the landlord plenty of time to share in the financial benefits.

Cost per Metric Ton of CO₂ Eliminated or Avoided

$\$6,500,000 / 14,175 \text{ tons} = \$458.55/\text{ton over 30 years}$

Obstacles

A great deal of education would be involved. Education and outreach would have to be done in multiple languages. Because of the relatively high cost of solar PV, this effort may need to be done in conjunction with energy efficiency improvements aimed at the same housing stock.

- Informing and educating landlords
- Informing and educating tenants

Partnerships

The goal would be to develop an approach that was endorsed by landlord groups like Tri-county Apartment Association and also by tenant groups.

(Note to users: include footnotes directly in the explanatory text here. To insert a footnote, depending on your version of Word, from the *Insert* menu choose *Footnote*, or from the *Insert* menu choose *Reference* and then *Footnote*. The footnote will automatically appear at the bottom of the page.)

Recommendation #10 (JBL2,Rev2)

Title: The City should promote solar water heating

Working Group: Energy/Renewable Energy

Statement of Issue: Reducing Mountain View's usage of natural gas can be accomplished most quickly and least expensively through the widespread adoption of modern solar water heating systems. Solar water heating is a mature and proven technology that uses the sun's free energy to help heat the water we all use in our homes and businesses. We know that solar water heating will reduce our consumption of natural gas. We know that modern solar water heating systems are robust and will continue operating for decades without additional energy or maintenance costs. We also know that the cost of electricity and natural gas will almost certainly continue increasing in the future, while the cost of heating our water with free, dependable solar energy will remain unchanged for as long as the sun shines on Mountain View.

Recommendations:

1. The City should task Staff, assisted as appropriate by volunteers, to determine the best options for promoting and facilitating the adoption of residential and commercial solar water heating. This action should include, minimally,

- * making information available, through multiple channels (including the City's website and water bills), to counteract ignorance of the viability of these systems and confusion over equipment and rebate issues;

- * exploring ways to improve the inspection and any other fees in favor of people who install these systems.

2. The City should require solar water heating on all new construction, unless closely-surrounding trees or other siting or design factors make this not viable. It should be determined whether billing logistics make this an impractical mandate also for apartments; it would be nice to find a way of getting around the current lack of financial incentives (if the user pays the energy bills but is not the owner).

- * Developers get quantity discounts, and any layout or structural issues that arise with retrofits will not exist because buildings are designed for this option at the start (thus a further reduction in installation cost).

- * Start-of-life installation of systems removes questions about payback times and the other logistical and psychological obstacles inherent in retrofits. It should be a great selling-point for developers, too: "You won't have to pay to heat water!"

3. The City Council should also consider the possibility of the City's offering low-cost or zero-cost loans to building owners and businesspeople to help them get solar water heating as soon as possible on existing structures.

Environmental Impact:

Every solar water heating system installed in Mountain View reduces the city's carbon footprint and dependence on finite fossil energy supplies.

For example, in 2005 we learned that "the carbon dioxide saved by using a solar water heater for a family of four is the same as that produced by driving a car (at an average fuel efficiency of 22 miles per gallon) 12,000 miles each year". (1)

Fiscal Impact and Synergies:

Here is a typical small-business example: a Mountain View laundromat. It uses the owner's utility bills and his intelligent guesses about other variables:

hot water usage: 121 gallons/day, or 44165 gallons/year

cost of gas used for water heating: \$1095/year

amount of gas used for water heating: 2637 therms/year

$2637 \text{ therms/yr} \times 13.4444 \text{ lbs. CO}_2 = 35,453 \text{ lbs. CO}_2$, or 8 metric tons

Assume a system cost of \$10,000 (a very generous estimate; it may be closer to \$6000). State rebates are expected starting in 2009, and the federal tax credits for solar water heating may yet be renewed. With luck, the end cost might be as low as several thousand dollars. Even at \$8500 (assume a State rebate of \$1500), however, the payback period is less than eight years; it decreases dramatically with a lower base cost and better rebates/credits. During eight years, 64 metric tons of CO₂ would be saved, at a cost of \$133/metric ton. Subsequently the savings occur with no associated cost.

For any solar water heating system, "Over the lifecycle of the system the cost is at least 20 percent lower than a conventional gas heater and 40 percent lower than an electric one. Those percentages will increase as the cost of gas and electricity rises and solar hot water systems continue to run on an energy source that is free!" (1)

Fiscal impact to the City would vary depending on how much, if any, was contributed to help finance this conversion. Given the short payback period, the cost is essentially that of the initial cash disbursement for the loan.

A small amount of Staff time would be needed depending on the options selected.

The City of Santa Clara has had a program (since 1975) to lease an installed solar water-heating system to "industrial process" applications, multi-family housing, and owners of swimming pools, with the user paying an installation fee and monthly gas bill deductions. This type of program appears much less suitable for Mountain View, which does not have its own utility; as mentioned above, the housing application would be very complex because of mixed incentives related to who pays what utility bill; the pool application does not appear to be needed in our city, since many pool owners have been installing solar heating systems on their own, or no heating at all.

Obstacles:

Probably the biggest obstacle is a general lack of understanding of this mature, very beneficial technology for home or business.

Partnerships:

Work with volunteer corps on outreach; encourage local solar water heating system installers to help Mountain View get thousands of these systems.

Citations: (1) Solar Energy Resource Guide, especially the section "An Introduction to Solar Hot Water", compiled and edited by Diana Young and Liz Merry; September 2005. An updated version of this publication is available in hardcopy or for download, for a small fee, at www.norcal solar.org. It is cited here as an usually lucid introduction to current solar hot water heating options and its financial and environmental implications. There are additional authoritative references given at the end of the article.

Websites: www.santaclaraca.gov (information about the City of Santa Clara's solar water heating program)

Appendix 1: Recommendations considered by the Working Group but not selected for the top 10 (in no particular order)

The City of Mountain View should purchase 100% green electricity.

The City should conduct a study to learn whether land owned by the city has the potential to be used to generate electricity from wind at a reasonable cost.

The City should develop a geothermal prototype project.

The City should encourage or require solar hot water heaters on all new homes and businesses.

The City should encourage restaurants to use yellow grease for biodiesel.

The City should enter the Solar America Cities contest in 2009 to win a grant to pay for implementation of some of these ideas.

The City should have a goal to create a sizeable number of solar roofs in MV and a program for achieving that.

The City should investigate programs like SMUD's SolarShares as a way to give apartment and condo residents a way to own their own solar energy systems.

The City should make ClimateSmart "opt-out" for new PG&E customers in Mtn. View.

The City should maximize the amount of Shoreline methane used to heat nearby buildings or produce electricity.

The City should offer a solar financing plan like the one being developed in Berkeley.

The City should offer underutilized vacant land as test-beds for solar and wind energy pilot sites.

The City should print inserts in its Utility Bills advising customers about energy conservation and renewable energy.

The City should put a solar cooker in each MV park.

The City should raise the utility users' tax for electricity and natural gas.

The City should require PV on new buildings.

The City should require solar hot water on new buildings.

The City should require that new pools and spas be heated by renewable energy sources.

The City should send energy conservation messages via SMS text messages.

The City should turn garbage into energy.

We should use solar on city buildings and city-owned land to feed the grid.

Appendix 2: Chapter References

Citations (not referenced in footnotes)

Enter citations here.

Web Sites (not referenced in footnotes)

Enter web sites here.

Contact Information

Enter contact information here.